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LAID-OPEN PATENT GAZETTE, JAPANESE PATENT OFFICE (JP)(A)

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Inventors: Shigeru Yuchi, Yoshihiro Uchida and Akio Fujikawa
Applicant: K. K. Osaka Yakuhin Kenkyusho
173-606 Higashi-Terauchi-cho
Toyonaka-shi
Representative: Yoshihiro Kiyohara, Patent Attorney

LIPID METABOLIZING FOOD

What is Claimed is:

1. A lipid metabolizing food containing an extract which is extracted from leaves of tea (*Thea sinensis*) as an essential ingredient.

Detailed Description of the Invention:

The present invention relates to a lipid metabolizing food and, more particularly, an object of the present invention is to provide a lipid metabolizing food containing an extract which is extracted from leaves of tea (*Thea sinensis*) as an essential ingredient.

Tea leaves were already recorded in old pharmaceutical books in China and brought to Japan by Eisai who was a priest of Ch'an Buddhism in Kamakura era. Today tea trees are widely cultivated and diffused.

Black tea used in European area was brought from China and India in early 19th century..

As such, types of tea are represented by green tea (Japan), oolong tea (China) and black tea (Europe).

Characteristic of each of those three types of tea is in its method of preparation and processing. Thus, green tea is a simply dried tea, oolong tea is a semi-fermented tea and black tea is a fermented tea.

The present inventors have studied the components of tea leaves for many years and, quite surprisingly, they have found a specific lipid metabolizing effect, unlike the conventionally known action of tea leaves, in a specific extract which is prepared by a specific extraction of the tea leaves whereupon the present invention has been achieved.

Tea leaves which are advantageously used in the present invention are commonly commercially-available non-fermented tea (green tea), semi-fermented tea (oolong tea, etc.) and fermented tea (black tea) as well as dried leaves, stems, etc. of tea tree and dried powder thereof.

In obtaining the extract of tea leaves used in the present invention, each site of the above-mentioned various tea products is firstly extracted with an acetone-water mixture, acetone is evaporated *in vacuo* from the supernatant liquid thereof, the residue is extracted with chloroform, ether, ethyl acetate, etc. and each of the extracts is concentrated *in vacuo* whereupon each extract is prepared.

Particularly effectively used extracts in the present invention are as follows.

In the case of non-fermented tea (green tea):

(1) an extract which is soluble in chloroform
(2) an extract which is soluble in ether
(3) an extract which is soluble in water;

In the case of semi-fermented tea (oolong tea, etc.):

(1) an extract which is soluble in chloroform
(2) an extract which is soluble in ether
(3) an extract which is soluble in ethyl acetate
(4) an extract which is soluble in water;

In the case of fermented tea (black tea):

(1) an extract which is soluble in chloroform
(2) an extract which is soluble in ether
(3) an extract which is soluble in ethyl acetate

(4) an extract which is soluble in water.

The present invention is not limited to the use of those extracts only. However, the reason why those specific extracts are particularly exemplified hereinabove is that, according to the experimental findings obtained by the present inventors, it is clear that each of them has a specific effect to each function of lipid metabolism.

As a result of the experimental findings of the present inventors using experimental animals, it has been found that each of the extracts has each of the following specific effects and, upon necessity, each extract may be jointly used.

(1) An extract which is soluble in chloroform in the case of non-fermented tea has a function of lowering neutral fat especially in liver.

(2) An extract which is soluble in ether in the case of non-fermented tea and an extract which is soluble in water in the case of non-fermented tea have a function of suppressing the increase of free fatty acid, lipid peroxide and G. P. T. (glutamic acid-pyruvic acid transferase) in serum and a function of suppressing the accumulation of neutral fat in liver.

(3) An extract which is soluble in chloroform in the case of semi-fermented tea has a function of lowering total cholesterol, free fatty acids, neutral fat and lipid peroxide in serum and a function of lowering total cholesterol and lipid peroxide in liver.

(4) An extract which is soluble in ether in the case of semi-fermented tea has a function of suppressing the increase of arteriosclerosis index and a function of suppressing the accumulation of lipid peroxide in liver.

(5) An extract which is soluble in ethyl acetate in the case of semi-fermented tea has a function of suppressing the increase of arteriosclerosis index and a function of suppressing the accumulation of total cholesterol and lipid peroxide in liver.

(6) An extract which is soluble in water in the case of semi-fermented tea has a function of suppressing the increase of free fatty acid and suppressing the neutral fat and a function of suppressing the accumulation of total cholesterol and lipid peroxide in liver.

(7) An extract which is soluble in chloroform in the case of fermented tea has a function of suppressing the increase of neutral fat, lipid peroxide, GOT (glutamic acid-oxaloacetic acid transferase) and free fatty acid in serum.

(8) An extract which is soluble in ether in the case of fermented tea has a function of suppressing the increase of free fatty acid and lipid peroxide in serum and a function of suppressing the accumulation of total cholesterol in liver.

(9) An extract which is soluble in ethyl acetate in the case of fermented tea has a function of suppressing the increase of lipid peroxide in serum and a function of preventing the accumulation of neutral fat in liver.

(10) An extract which is soluble in water in the case of fermented tea has a function of suppressing the increase of free fatty acid, neutral fat and lipid peroxide and a function of suppressing the accumulation of neutral fat in liver.

On the basis of each of the specific effects of each component obtained by the animal experiments, compounding amount and compounding combination thereof for the food of the present invention may be considered and determined taking the requested effect into consideration.

In the lipid metabolizing food according to the present invention, all of or optional combination of the specific extracts of tea leaves as mentioned in detail hereinabove may be added to and compounded with a food.

The final form of the food used in the present invention may be any of main dish, side dish, confectionery, soft drinks, etc. With regard to the usual amount to be taken, it may be made about 3~15 grams per day on the basis of the original dried stem (powder).

The present invention will now be further illustrated by way of the Example and the Test Examples as follows.

Example

Dry powder of 140 g each of green tea, oolong tea and black tea as non-fermented tea, semi-fermented tea and fermented tea, respectively, was

used. The powder was homogenized with 4 liters of acetone-water (1:1), acetone was removed *in vacuo* from the resulting supernatant liquid, an aqueous layer was extracted with chloroform, ether and ethyl acetate successively and each of the extracts was concentrated *in vacuo* to give each specific extract.

Those specific extracts are as follows. Thus, they are (1) an extract of non-fermented tea soluble in chloroform; (2) an extract of non-fermented tea soluble in ether; (3) an extract of non-fermented tea soluble in water; (4) an extract of semi-fermented tea soluble in chloroform; (5) an extract of semi-fermented tea soluble in ether; (6) an extract of semi-fermented tea soluble in ethyl acetate; (7) an extract of semi-fermented tea soluble in water; (8) an extract of fermented tea soluble in chloroform; (9) an extract of fermented tea soluble in ether; (10) an extract of fermented tea soluble in ethyl acetate; and (11) an extract of fermented tea soluble in water.

Components of those specific extracts were catechin, epicatechin, catechin gallate, epigallocatechin, epigallocatechin gallate, etc.

Each of those specific extracts was compounded with the following soft drink to prepare a soft drink according to the present invention.

Sweetener (reducing sugar)	102 g
Glucose	34 g
Tartaric acid	75 g
Citric acid	2.7 g
Apple juice	65 g
Flavour	1.1 g
Water	q.s.
Extract	1,500 mg
Total	1,000 cc

With regard to the extract in the above formulation, each of the above-mentioned extracts was appropriately combined for a purpose of potentiating the hepatic function.

Test Example 1

Male of 43 years age; body weight: 85 kg; height: 165 cm. He was quite apt to be tired, apt to catch cold and has a feeling of exhaustion.

When he took each 180 cc of the above-prepared soft drink three times a day and continued for three months whereupon his recovery from fatigue became quick and he did not show a symptom of hangover. In addition, he completely recovered from fatigue after a sleep for one night and his body weight decreased to 80 kg. When he continued to take the soft drink for 6 months more, his body weight decreased to 75 kg.

Test Example 2

Female of 45 years age; body weight: 66.0 kg; height: 153 cm.

When she took each 180 cc of the above-prepared soft drink three times a day and continued for three months whereupon her body weight decreased to 61 kg. Total cholesterol in serum decreased from 241.3 mg to 200.5 mg and neutral fat decreased from 122.0 mg to 82.0 mg.

From the above results, it is noted that the lipid metabolism food according to the present invention has an excellent obesity-suppressing and lipid-suppressing effects.

[End]

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㊹発明の名称 脂質代謝食品

㉑特 願 昭58－222823

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⑦発明者 有地 滋 豊中市寺内2丁目6番1号1002

⑦発明者 内田 義弘 大阪市大正区泉尾1丁目22番23号

⑦発明者 藤川 明男 京都市伏見区深草平田町4

⑦出願人 株式会社大阪薬品研究所 豊中市東寺内町173番606号

⑭代理人 弁理士 清原 義博

明細書

1．発明の名称

脂質代謝食品

2．特許請求の範囲

(1) 茶葉(Tea shinensis)から抽出された抽出物を必須成分として含有する脂質代謝食品。

3．発明の詳細な説明

この発明は脂質代謝食品に関し、より詳しくはこの発明の目的は茶葉(Tea shinensis)から抽出された抽出物を必須成分として含有してなる脂質代謝食品の提供にある。

茶葉(Tea shinensis)は、古くは中国の薬物書にも記載され、又日本へは鎌倉時代の禅宗の僧栄西に依ってもたらされ、広く一般に栽培され又普及されている。

ヨーロッパ各地で用いられている代表的な紅茶も19世紀初期に中国，インドを経てもたらされている。

このように茶の種類は、緑茶(日本)、ウーロン茶(中国)、紅茶(ヨーロッパ)に代表されるこの三種の茶の特徴は製造、加工法にあり、緑茶は乾燥茶、ウーロン茶は半醗酵茶、紅茶は醗酵茶である。

この発明者らは、茶葉(Tea shinensis)の含有成分を長年に亘って研究してきたところ、何と驚くべきことに従来より広く知られていた茶葉(Tea shinensis)の作用とは全く異なり、この茶葉(Tea shinensis)の特定抽出法に基づく特定抽出物中に特定脂質代謝効果があることを見いだし、この発明に到達した。

この発明で好適に使用できる茶葉(Tea shinensis)としては通常市販の不醗酵茶(緑茶)、半醗酵茶(ウーロン茶等)、醗酵茶(紅茶)の茶葉又は茶の木(Tea shinensis)の葉、茎等の乾燥物又は乾燥粉末が好適に使用できる。

この発明で使用する茶葉(Tea shinensis)抽出物を得るには、前記各種茶の各部位において、まずそれぞれをアセトン－水混合液で抽出し、その上清液を減圧下でアセトンを留去し、このクロ

ロホルム、エーテル、酢酸エチルエステル、等で抽出し、これら各抽出成分を減圧濃縮すれば、各抽出エキスをえられる。

この発明で特に有効に使用できるエキスしては、不醗酵茶（緑茶）の場合：

(1)クロロホルム可溶部エキス、

(2)エーテル可溶部エキス、

(3)水可溶部エキス、で、

半醗酵茶（ウーロン茶等）は；

(1)クロロホルム可溶部エキス、

(2)エーテル可溶部エキス、

(3)酢酸エチルエステル可溶部エキス、

(4)水可溶部エキス、で、

醗酵茶（紅茶）は；

(1)クロロホルム可溶部エキス、

(2)エーテル可溶部エキス、

(3)酢酸エチルエステル可溶部エキス、

(4)水可溶部エキス、が好適に使用できる。

この発明はこれらのエキスに必ずしも限定されるものでは無いが、これらの特定抽出エキスを特に例示する理由は、これら各例示エキスがこの発明者らの実験的知得に基づけば、脂質代謝の各機能に対しそれぞれ特定の効果を持つことが明らかになっているからである。

この発明者らの動物実験に基づく実験的知得によれば、各抽出エキスが以下に列記する、それぞれ特有の効果をもつことが判明しており、必要に応じて、それぞれの各抽出物を組み合わせればよい。

(1)不醗酵茶クロロホルム可溶部エキスは特に肝臓中の中性脂肪を低下させる機能、

(2)不醗酵茶エーテル可溶部エキス及び不醗酵茶水可溶部エキスは血清中の遊離脂肪酸，過酸化脂質及びG.P.T.（グルタミン酸－ピルビン酸転移酵素）の上昇抑制機能及び肝臓中の中性脂肪の蓄積抑制機能をもつ。

(3)半醗酵茶クロロホルム可溶部エキスは血清中の総コレステロール，遊離脂肪酸，中性脂肪，過酸化脂質，の低下機能及び肝臓中の総コレステロール及び過酸化脂質の低下機能を持ち、

(4)半醗酵茶エーテル可溶部エキスは動脈硬化指数の上昇抑制能及び肝臓中の過酸化脂質の蓄積抑制機能を持つ、

(5)半醗酵茶酢酸エチルエステル可溶部エキスは動脈硬化指数の上昇抑制能及び肝臓中の総コレステロール及び過酸化脂質の蓄積抑制機能、

(6)半醗酵茶水可溶部エキスは血清中の遊離脂肪酸の上昇抑制機能及び中性脂肪抑制機能更に肝臓中の総コレステロール及び過酸化脂質蓄積の抑制能をもつ。

(7)醗酵茶クロロホルム可溶部エキスは血清中の中性脂肪，過酸化脂質，GOT（グルタミン酸－オキサル酢酸転移酵素），遊離脂肪酸の上昇抑制機能を持ち、

(8)醗酵茶エーテル可溶部エキスは血清中の遊離脂肪酸，過酸化脂質の上昇抑制機能及び肝臓中の総コレステロールの蓄積抑制機能をもち，

(9)醗酵茶酢酸エチルエステル可溶部エキスは血清中の過酸化脂質の上昇抑制機能及び肝臓中の中性脂肪の蓄積防止機能を持ち、

(10)醗酵茶水可溶部エキスは血清中の遊離脂肪酸及び中性脂肪，過酸化脂質の上昇抑制機能及び肝臓中の中性脂肪の蓄積抑制機能を持つ。

この動物実験による各成分の各特定効果に基づき、要求される効果に基づきこの発明食品への配合量、配合組合せを勘案して決定すればよい。

この発明に係る脂質代謝食品は、前記詳述した茶蒸（Tea shinensis）各特定抽出成分の全て又は、任意組合せで、添加配合して食品とすればよい。

この発明において採用する最終食品形態としては、主食あるいは副食、お菓子、清涼飲料水等の任意の食品形態とすれば良く、又通常の摂食量としては一日当たり茶葉抽出物が風乾緑茶（粉末）換算3～15g程度となるように配合すればよい。

以下この発明の実施例並びに試験例を示すことにより、この発明をより一層明確なものとする。

実施例

不醗酵茶として緑茶、半醗酵茶としてウーロ

ン茶、醗酵茶として紅茶をそれぞれ乾燥粉末140g使用し、アセトン－水（1：1）（4リットル）でホモジナイズし、この上澄み液を減圧下でアセトンを除去した後、水層をクロロホルム、エーテル、酢酸エチルエステル、で順次抽出し、各抽出各分を減圧濃縮して、各特定抽出エキスを得た。

これらの各特定抽出エキスを列記すると、(1)不醗酵茶クロロホルム可溶部エキス、(2)不醗酵茶エーテル可溶部エキス、(3)不醗酵茶水可溶部エキス、(4)半醗酵茶クロロホルム可溶部エキス、(5)半醗酵茶エーテル可溶部エキス、(6)半醗酵茶酢酸エチルエステル可溶部エキス、(7)半醗酵茶水可溶部エキス、(8)醗酵茶クロロホルム可溶部エキス、(9)醗酵茶エーテル可溶部エキス、(10)醗酵茶酢酸エチルエステル可溶部エキス、（11）醗酵茶水可溶部エキスである。

これらの特定抽出エキスの成分は、カテキン、エピカテキン、カテキンガレート、エピガロカテキン、エピガロカテキンガレート等であった。

この特定各抽出エキスを次の組成の清涼飲料水に配合してこの発明にかかる清涼飲料水を調製した。

組　　成	
甘味料（還元糖）	102g
葡萄糖	34g
酒石酸	75g
クエン酸	2.7g
りんご果汁	65g
フレーバー	1.1g
水	適量
エキス	1500mg
合　　計	1000cc

この内エキス分は肝機能増大用として上記各分を適宜組み合わせた。

試験例 (1)

４３才男性。体重８５Ｋｇ、身長１６５ｃｍ、極めて疲れやすく、風邪を引きやすく、脱力感がある。

一日３回各１８０ｃｃずつ、実施例で得た清涼飲料水を３ケ月間飲用した所、疲労の回復が早くなり、二日酔の症状がなくなった。

また、確実に一晩の睡眠で疲労回復が図れ、体重も８０Ｋｇに減少した。

その後、６ケ月続けて実施例で得た清涼飲料水の飲用を続けたところ、７５Ｋｇに体重が減少した。

試験例(2)

４５才女性。体重６６．０Ｋｇ。身長１５３ｃｍ。

試験例(1)と同様一日３回各１８０ｃｃずつ、実施例で得た清涼飲料水を３ケ月間飲用した所、体重６１Ｋｇに減少した。

尚、血清中の総コレステロールは241.3 から200.5mg にまた中性脂肪は122.0 から82.0mgにそれぞれ減少した。

以上の結果から明らかな如く、この発明にかかる脂質代謝食品は肥満抑制、脂質抑制効果に優れていることが判る。

代理人　弁理士　清　原　義　博